

Pierson Process Technology

P. O. Box 800132
Santa Clarita, California 91380
USA

Telephone (661) 263 9948

Telefax (661) 263 9958

Email spiereson@earthlink.net

Arkwood Pilot System:

System description:

The System will be designed to ozonate 30 to 40 gallons per minute of water from two existing wells, so that the ozone laden water can be returned to the aquifer. The ozonated water ideally will assist in oxidizing PCP as well as freeing PCP existing in the formation for treatment downstream. Typically, direct ozonation reactions selectively target double carbon bonds.

The ozone equipment will be located in an existing building within a silo at the Arkwood site.

The system will include an ozone generator and oxygen concentrator for production of ozone from oxygen feed gas, a mass transfer system for dissolution of the ozone gas into groundwater, an off gas destruct unit for converting any non dissolved ozone back into oxygen, and a control and monitoring system – designed for a manual start of the system, automatic shutdown for key operating parameters, and measuring and recording ozone production, water flow, and ozone residuals.

The ozone system will be designed for an initial capacity of 12 PPD of ozone, which will allow for an ozone dosage of up to 33 mg/l of applied ozone to the groundwater. Should additional ozone capacity be desired in the future, the ozone generator has the capacity to be increased to 16 to 20 PPD ozone by increasing the oxygen flow to the ozone generator (additional mass transfer system modifications would be required to accommodate the additional flows).

Equipment specifications:

Ozone Generator

The ozone generator shall be a corona discharge, water cooled ozone generator, with high efficiency stainless steel/borosilicate glass dielectric assemblies and integrated medium, frequency power supply. The ozone generator shall be a PCI-Wedeco model GSO 50

Capacity: Nominal capacity of 16 PPD ozone @ 10% by wt in oxygen
12 PPD ozone @ 12% by wt. in oxygen
24 PPD ozone @ 6% by wt in oxygen

Dimensions: 36" wide x 19" deep x 64" high

Utilities: Oxygen - 1 scfm oxygen at 25 psig
Cooling water - 3 gpm, potable quality, 68°F

Power - 460 volt, 3 phase, 5.4 amps

Connections: Oxygen inlet: ½" FNPT
Ozone Outlet ½" FNPT
Cooling Water Inlet ½" FNPT
Cooling Water Outlet ½" FNPT

Compressor/oxygen concentrator Skid

The compressor/oxygen concentrator skid includes a rotary screw compressor, air receiver, oxygen concentrator, oxygen surge tank, factory skid mounted and pre-plumbed.

The compressor shall be a rotary screw compressor , providing optimum performance, the compressor shall be an Atlas Copco GXC5FF Compressor with integrated of refrigerant dryer, compressed air filters and a 53 gallon air tank .

The oxygen concentrator shall be a twin bed molecular sieve based oxygen concentrator, plc controlled with a capacity of 75 scfh of oxygen at 93% purity or higher. The oxygen concentrator shall be an OGSi model OG-75

The oxygen storage tank shall be an 80 gallon storage tank complete with pressure gauge, relief valve oxygen pressure regulator, and oxygen hoses.

Dimensions: 60" x 84"

Utilities: 460 volts, 3 phase, 12 amps

Mass Transfer Skid

The mass transfer skid consists of a booster pump, venturi injector with flow bypass, contact tank, degassing separator, and off gas relief valve. Instrumentation located on the mass transfer skid shall be a residual ozone analyzer and a totalizing flow meter, both with 4-20 mA outputs to a circular chart recorder.

Dimensions: 48" x 60"

Utilities: 460 volts, 3 phase, 4 amps

Off Gas Destruct Unit

Destruct unit shall be a catalytic type off gas destruct unit with thermal assist. The catalyst shall be Carulite 200, a manganese dioxide/copper oxide catalyst for efficient ozone destruction. Destruct unit shall be rated for 600 scfh. Pre-heater shall be rated at 150 watts.

Utilities: 120 Volts, single phase, 150 watts

Residual ozone analyzer

The residual ozone analyzer shall be designed to continuously monitor ozone residual at the effluent of the mass transfer system. The ozone sensor shall be a direct measuring polarographic sensor utilizing a special polymeric membrane to isolate the sensing electrodes from the sample.

The Dissolve Ozone Monitor shall provide a display of the dissolved ozone concentration directly in PPM on a backlit LCD display. The monitor shall have a range of up to 20 mg/l residual ozone. The monitor shall have a 4-20 mA output and two programmable alarm contacts. The monitor shall be housed on a NEMA 4X fiberglass enclosure.

The dissolved ozone sensor shall be mounted in a gravity fed flow cell with a flow rate of 15 gallons per hour of sample, with discharge to drain.

High Concentration Ozone Analyzer

The high concentration ozone monitor shall be a UV absorption, dual beam photometer with a long life mercury vapor lamp ozone concentration monitor with a microprocessor controlled 254 nm UV light source & photoreceptor, with inlet filtration and flow control. Range of 0-200 g/Nm³.

System Control Panel

The system control panel shall be designed to start, stop, and shut down the system in the event of alarm conditions. The panel shall be NEMA 4 fiberglass enclosure, and fabricated to UL 508 standards.

The equipment to be controlled by the control panel includes:

- Air Compressor/Oxygen Concentrator skid
- Ozone Generator
- Mass transfer skid
- Off gas destruct unit
- Ambient ozone detector

The control panel will include a main disconnect, emergency stop, and the following panel indicators/operators:

- Panel Indicators(annunciator: Panalarm or Ronan)
 - System ON
 - Generator On
 - Oxygen Concentrator On
 - Alarm Lights
 - Low well flow
 - Loss of vacuum
 - Backflow failure
 - Ozone Generator failure
 - Ambient ozone alarm

(Note: Generator failures indicated on Generator panel will be:

High water temp, low oxygen flow, power supply fault,
Power supply high temp)

- Selector switches:

System Start/off	On/Off
Ozone Generator	Hand/off/auto
Oxygen concentrator	Hand/Off/Auto
Mass transfer Skid	Hand/Off/Auto
Off gas destruct	Hand/Off/Auto

Ambient Ozone Detector

The ambient ozone detector shall be an electrochemical ozone gas sensor that will create a signal proportional to the ozone concentration present, mounted in a fiberglass enclosure. The receiver shall have an LED display to indicate ambient ozone levels in parts per million as well as flashing indicators if adjustable alarm contact set points are exceeded.